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Cheryle A. Broom
King County Auditor

516 Third Avenue, Room W1020
Seattle, WA 98104-3272

(206) 296-1655
TTY 296-1024

M E M O R A N D U M

DATE: April 23, 2002

TO: Metropolitan King County Councilmembers

FROM: Cheryle A. Broom, County Auditor

SUBJECT: Performance Audit of the King County Sheriff's Communications Center

Attached for your review is the final report of the Performance Audit of the King County Sheriff's Communications Center. This audit was prompted by council concerns over the Comm Center's difficulty meeting its performance standards, and by Comm Center staff's concerns over increasing workload and overtime. The objectives of this audit were to evaluate to what extent the Comm Center is effectively and efficiently providing emergency communication services, and to determine whether recent workload changes, management practices, or staffing factors explain the Comm Center's recent performance difficulties.

The audit concluded that the Comm Center's operations are fundamentally sound and that it has historically had a relatively good performance record. However, it has experienced significant operating difficulties in recent years that have interfered with its ability to efficiently provide emergency communication services and to effectively meet its call-answering standard. We found that these performance difficulties were caused by:

- Increases and changes in workload levels.
- An expansion of the Comm Center's responsibilities without corresponding staff increases or workload adjustments.
- Staffing management practices that need to be revised and updated to reflect staffing needs and changes in workload demands.

This report makes recommendations to the Comm Center and the Sheriff's Office to enhance workload monitoring efforts, pursue options for relieving dispatcher workload and strain on the dispatch communication system, improve the means used to calculate staffing and cost impacts of changes to the Comm Center's workload, and strengthen staff management methods.

The Sheriff's Office is in overall agreement with the audit's findings and recommendations and the audit team agrees with the proposed approaches to implementing the recommendations.

The audit team wishes to express its appreciation for the full cooperation and assistance we received from the Sheriff's Office while conducting this audit, including staff in Research, Planning and Information, Field Operations, and Budget and Accounting. We would especially like to thank Captain Brad Thompson, Comm Center Operations Manager Jean Best, and their staff, notably Technical Services Coordinator Steve Lagreid, for the time they invested in assisting us.

CB:ED:jl
Attachment

PERFORMANCE AUDIT

KING COUNTY SHERIFF'S COMMUNICATIONS CENTER

Presented to
the Metropolitan King County Council
by the
County Auditor's Office

Cheryle A. Broom, CGFM, CIG, King County Auditor
Elizabeth DuBois, Senior Management Auditor
Alessandra Pollock, Management Auditor Intern

Report No. 2002-02

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Abbreviations

CAD	Computer Automated Dispatch
Comm Center	King County Sheriff's Office Regional Communications Center
E-911	King County Emergency Management Division's Enhanced 911 Office
FTE	Full-time Equivalent
IRIS	Incident Reporting and Investigation System
KCSO	King County Sheriff's Office
MDC	Mobile Data Computers
MOU	Memorandum of Understanding
PSAP	Public Safety Answering Point
RCECC	Regional Communications and Emergency Coordination Center

REPORT SUMMARY

Introduction

In March of 2001, the King County Auditor was asked to conduct an audit of the Sheriff's Communications Center (Comm Center). This request arose as a result of workplace concerns raised before the council by Comm Center staff regarding the work environment, increasing overtime, turnover and vacancy rates, and the Comm Center's difficulty meeting its performance standards.

Audit Scope and Objectives

To gain an understanding of these concerns and evaluate the Comm Center's overall performance, the Auditor's Office undertook a performance audit. Our primary audit questions were:

1. Is the Comm Center providing emergency communications services effectively and efficiently?
2. Can workload or operational factors explain the Comm Center's recent performance difficulties?

We addressed these questions by assessing the current "state of the Comm Center," in light of its past performance; analyzing historical changes in employee workload; and evaluating the effectiveness of management and staffing practices.

General Conclusions

Our audit found that the Comm Center is in overall compliance with its Public Safety Answering Point (PSAP) contract, meets or exceeds professional standards, and has historically had a fairly successful performance record. In addition, while it has faced ongoing recruitment and retention challenges, this is typical of emergency 911 centers locally and nationwide.

However, our analysis found that the operating difficulties the Comm Center has recently experienced, which have included sharp increases in turnover, vacancy, and overtime rates, were

caused by factors other than typical ongoing staffing challenges, including:

- Moderate increases and substantial changes in workload levels for call receivers and dispatchers.
- An expansion of the Comm Center's responsibilities without corresponding staff increases or workload adjustments.
- Staffing management practices that do not reflect staffing needs and changes in workload demands.

These factors interfered with the Comm Center's ability to efficiently provide emergency communication services and to effectively meet its performance standard.

This report makes recommendations to the Comm Center and the Sheriff's Office to enhance workload monitoring efforts; pursue options for relieving dispatcher workload and strain on the dispatch communication system; improve the means used to calculate staffing and cost impacts of changes to the Comm Center's workload; and to strengthen staff management methods.

Background

The King County Sheriff's Regional Communications Center is one of 17 PSAPs in King County. It provides emergency 911 services, police dispatching, and crime reporting services for approximately 570,000 residents in unincorporated King County and 13 incorporated cities. The Comm Center also handles fire and medical 911 calls; however, local departments provide the dispatching for such emergencies. In addition, staff also provides call receiving and dispatching for the Metro Transit Police and King County Animal Control. The Comm Center's 2001 budget was approximately $5.7 million with a staff of 90 full-time equivalents (FTEs). An additional three FTEs are funded through the Criminal Justice budget.

Comm Center's emergency services are provided by a staff of call receivers who take incoming emergency calls and complete approximately 30 percent of the Sheriff's Office criminal offense reports. Under a contract with the King County Emergency Management Division, the Comm Center (as with all PSAPs within the county) must meet a performance standard of answering 90 percent of its 911 calls in less than 10 seconds, 75 percent of the time, in order to receive its share of the 911 excise tax.

Dispatchers provide radio-dispatching services to each of the Sheriff's five field precincts. They are responsible for dispatching patrol deputies and other field units in response to 911 calls ("dispatched calls for service") and for monitoring the units' location and status while they are responding to these calls and performing unit-initiated law enforcement activities called "on-views."

A new Regional Communication and Emergency Coordination Center (RCECC) is under construction in Renton with a planned completion for the summer of 2003.

SUMMARY OF FINDINGS AND RECOMMENDATIONS

CURRENT "STATE OF THE COMMUNICATIONS CENTER"

Finding 2-1 (Page 14)   **The Comm Center has experienced recent operational difficulties that have impacted its ability to operate efficiently and to effectively meet its performance standards.**

Our audit found that the Comm Center is in overall compliance with its PSAP contract, meets or exceeds professional standards, follows operational practices similar to those of comparable

regional communications centers, and has historically had a fairly successful performance record.

However, our review found that the Comm Center has experienced recent operating difficulties that are not characteristic of its past performance or attributable to industry recruiting difficulties. Between 1997 and 2001, the Comm Center's turnover and vacancy rates increased sharply and subsequent overtime use nearly tripled, increasing overtime expenditures and individual staff workload. The Comm Center did not meet its call-answering performance standard during the second and third quarter of 2001 and, for the first time, had E-911 funds temporarily withheld until performance was improved.

Our review of the workplace concerns raised by Comm Center staff indicates that the air quality issues have been addressed with some success. However, some challenges are expected to be ongoing due to the County Courthouse's aging ventilation system and the Comm Center's proximity to the loading dock. The move to the new RCECC in 2003 is expected to resolve them.

WORKLOAD ANALYSIS

Summary

Overall, we found that dispatchers, and to a lesser extent call receivers, have experienced some growth in workload with substantial increases on certain days and shifts. These increases have impacted the Comm Center's ability to effectively meet their call-answering standard and have contributed to dispatcher communication difficulties. However, the overall workload changes were modest, and only partially explain the Comm Center's recent operating difficulties.

Finding 2-2 (Page 19) **Primary call receiver workload has increased substantially during certain days and times and most likely impacted the Comm Center's ability to meet their call-answering standard.**

Our analysis shows that while the total number of calls received in 2001 has risen by 3 percent since 1998, call volumes increased substantially during certain days and times. These concentrated increases created a noticeable workload impact for the staff working at these times, who experienced up to a 20 percent increase in the number of calls they were handling, and impacted their ability to meet their call-answering standard at certain times. But other factors such as understaffing caused by the high number of vacancies also had an effect. This prevented us from concluding overall whether workload increases or understaffing caused them to miss the standard; it was most likely a combination of the two.

Finding 2-3 (Page 22) **Secondary call receiver workload has decreased in some areas and increased in others, and their overall service levels have declined.**

The results of our research show that the patterns of secondary call receiver workload changed between 1999 and 2001, with decreases in several areas and increases in others. The number of crime reports taken dropped by 3.6 percent overall, with variations by time and day of the week. In addition, the number of phone calls handled declined by 11 percent, while the average duration of these calls increased by almost 19 percent. Because of these mixed results, it is difficult to determine the impact of these changes on secondary call receiver performance. The only available performance indicator for their "service level" is the average hold time for calls in the secondary queue. Hold times

have almost doubled since 1999. The net impact of these changes is thus somewhat inconclusive; and although their service levels have declined, workload increases may not be the only cause.

Finding 2-4 (Page 25)

Increases in the number of officers per dispatch radio and in radio talk time are straining dispatch communication resources.

Our analysis of dispatcher workload, including the number of deputies on each radio, the number of incidents handled, and radio usage, shows that dispatcher workload has risen and the dispatch communication system is showing signs of strain.

Data from the Sheriff's Office shows that the minimum number of deputies that dispatchers are responsible for monitoring and dispatching rose between 1995 and 2001, with most of the growth occurring on the day shift. The number of incidents handled by dispatchers increased on some of the precinct radios but remained the same or decreased on others.

While there are no standards for the number of deputies or the incidents a dispatcher can manage, a 1995 study of dispatcher workload in the Sheriff's Comm Center determined that 11 to 13 incidents per hour was generally the maximum one dispatcher could manage effectively. In 2001, the average incidents per hour on all three main dispatch radios consistently exceeded these levels during the late afternoons and evenings.

Between 1995 and 2001, the overall amount of time the dispatch radios are in use (talk time) increased from 20 to 25 percent, with larger increases on some of the dispatch radios. Part of this increase may be due to the Comm Center's discontinuation of a dispatcher support radio (called Stats) which removed certain

deputy-dispatcher communications from the main radio frequencies. While there are no standards for radio use levels, our audit identified recommended benchmarks of 30 to 35 percent talk time levels for effective communication on public safety radio systems. Our analysis shows that talk time levels regularly exceed these levels.

These increases in workload and radio usage are beginning to strain dispatcher capacity, are creating communication delays between the Comm Center and the field, and are making the communication system less effective. Based on our research, a wireless communication and dispatching system (referred to as "mobile data") has the potential to relieve some of this strain, improve communication efficiency, and increase the capacity of the current communication system.

To relieve dispatcher workload, **the audit recommends** that the Comm Center evaluate the feasibility of restarting the Stats channel during peak hours. In addition, **we recommend** that the Sheriff's Office continue its efforts to pursue mobile data dispatching and communications as an option for reducing dispatcher workload and improving the efficiency and effectiveness of dispatch communications.

Finding 2-5 (Page 34)   **The Comm Center could improve its monitoring of dispatcher workload.**

Our review found that the Comm Center does not regularly monitor the workload levels of its dispatching operations. While data on dispatched calls for service and on-views is available, it is typically maintained for patrol workload purposes and is not monitored from a dispatcher's perspective. Other elements of a dispatcher's job, such as radio talk time levels, the number of

database queries run and phone calls answered, are checked sporadically or are not tracked. This lack of information has limited the Comm Center's ability to proactively manage its dispatcher resources.

To improve its ability to manage changes in workload, **the audit recommends** that the Comm Center begin monitoring dispatcher workload for each of its dispatch radios, including the number of incidents handled, radio talk time levels, and phone call volumes.

MANAGEMENT AND STAFFING FACTORS

Summary

We found that over the last four years, the Comm Center's resources have been strained by the addition of responsibilities without commensurate staff increases, hiring practices that created a gap in the flow of new employees, and a staffing model that has not been updated to reflect workload changes.

Finding 2-6 (Page 36)

The Comm Center's responsibilities were expanded; however, the staffing increases it received were insufficient to cover the additional staffing requirements.

Our analysis shows that the Comm Center's responsibilities were expanded over the last four years; however, the new staffing it received was insufficient to cover the additional responsibilities. Between 1997 and 2000, the Comm Center was given additional dispatching responsibilities including Animal Control dispatching and the new Shoreline and Metro Transit Police dispatch radios, which required approximately 13 FTEs. However, it only received nine additional FTEs for these purposes. To provide the necessary staffing, the Comm Center used existing call receiving personnel and discontinued "Stats," a dispatcher support function. We found that the Comm Center and the Sheriff's Budget and Accounting Section have not developed an

adequate means of calculating Comm Center staffing requirements (i.e., a staffing relief factor), which most likely explains why the new staffing allocated did not match actual needs.

The audit recommends that the Sheriff's Office ensure that potential staffing and fiscal impacts are fully assessed when changes are made to Comm Center responsibilities. To improve this assessment process, **the audit also recommends** that the Comm Center work with the King County Sheriff's Office's (KCSO) Budget and Accounting Section to develop a staffing relief factor appropriate for the Comm Center.

Finding 2-7 (Page 39)   **The Sheriff's Office is not being fully reimbursed for Comm Center dispatching services provided to other agencies.**

While analyzing the staff changes required by the Comm Center's new dispatching responsibilities, we found that two of the new functions being provided to agencies outside of the Sheriff's Office are not fully funded by the other agencies. Metro Transit is not fully covering the cost of the dispatching services provided by the Comm Center. Because the Metro dispatch positions are funded through the Current Expense (CX) fund, the CX fund is in effect subsidizing about $180,600 in transportation costs. In addition, King County Animal Control does not reimburse the Sheriff's Office for Animal Control dispatching services, which costs approximately $281,200 annually.

The audit recommends that the Sheriff's Office clarify the terms of its agreements with Metro and Animal Control regarding full coverage of the costs of providing dispatching services, and make the appropriate adjustments to the Sheriff's budget and

Comm Center staffing. These agreements should be updated annually to reflect changes in staffing costs and operations.

| Finding 2-8 (Page 41) | **Infrequent hiring in 2000 and 2001 created a gap in the flow of new employees that contributed to the Comm Center's high vacancy rate and impacted its performance.** |

Between January and August 2000, the Comm Center completed one hiring round and initiated a second. However, due to training scheduling difficulties and staff illness, no one was hired from the second round until May 2001, nearly nine months later. During this 9 month period, 16 people resigned from the Comm Center, a turnover rate nearly double the Comm Center's typical rate of less than one person per month. The combination of limited recruiting efforts and this increase in turnover created a gap in the flow of new employees.

Since the beginning of our audit, the Comm Center has accelerated its hiring and as of December 2001, its vacancy rate was 7 percent, down from a high of 25 percent in July. Management has also begun recruiting on a modified "open-continuous" basis, which is expected to relieve the current staffing crisis.

The audit recommends that the Comm Center improve its ability to minimize the impact of staff vacancies by closely monitoring its turnover rate and implementing frequent and regular hiring rounds.

Finding 2-9 (Page 42)   **Phasing out the vapor positions contributed to the Comm Center's vacancy and performance difficulties.**

The Comm Center has ten unfunded "vapor positions" in its budget that allow management to hire additional staff beyond the Comm Center's budgeted FTE level. By hiring in advance of anticipated vacancies, these vapor positions enable management to have new employees all or part of the way through the Comm Center's lengthy new employee training program by the time the next resignation occurs.

Due to fiscal constraints, the Comm Center lost the budget authority to use these vapor positions between 1999 and 2001. This occurred at the same time that workload was increasing and additional responsibilities were added, and contributed to the staffing difficulties. Given the Comm Center's extensive training program, inflexible workload requirements, and the need to meet performance standards, we found that the vapor positions can enable the Comm Center to more effectively and efficiently maintain necessary staffing levels. We also found that if use of the positions does not exceed turnover rates, there will be no negative budget impact. Since the conclusion of our analysis, the Comm Center's authority to hire into the vapor positions has been restored.

The audit recommends that the Comm Center continue using the vapor positions in conjunction with frequent hiring rounds, while monitoring attrition rates to determine how many vapor positions can be used without creating a year-end budget deficit.

Finding 2-10 (Page 45)   **The Comm Center's staffing plan is based on a sound method for ensuring appropriate staffing levels. However, because the levels have not been updated to reflect changes in call receiver workload, the Comm Center's staffing efficiency and ability to meet its call-answering standard have been negatively impacted.**

While the Comm Center's staffing model is appropriately designed and uses standard methods for call center staffing, our audit found that it has not been adequately updated to reflect changes in call receiver workload. Our staffing analysis shows that staffing levels are frequently too low for the Comm Center to successfully meet its call-answering standards, and at other times may be too high.

In addition, the Comm Center's staffing model does not provide discrete information on the number of primary call receivers needed to meet the call-answering standard and the number of secondary call receivers needed. Because these figures are not separated, it is difficult to use the staffing model for planning and monitoring staffing levels for each type of call receiver.

To strengthen its staffing management practices, **the audit recommends** that the Comm Center update its minimum staffing levels to reflect recent workload changes; continue tracking existing workload information and begin tracking outbound call duration data; revise its call receiver staffing model to more discretely specify primary and secondary staffing levels; and consider revising its staffing model to reflect quarterly variations in call volumes.

Summary of the Sheriff's Office Response

The Sheriff's Office is in overall agreement with this report's findings and recommendations. It has already begun implementing some of the recommendations, and while the others present fiscal and operational challenges, the audit team agrees that the Sheriff's Office's approaches to implementing them are reasonable.

Acknowledgement

The audit team wishes to express its appreciation for the full cooperation and assistance we received from the Sheriff's Office while conducting this audit, including staff in Research, Planning and Information, Field Operations, and Budget and Accounting. We would especially like to thank Captain Brad Thompson, Comm Center Operations Manager Jean Best, and their staff, notably Technical Services Coordinator Steve Lagreid, for the time they invested in assisting us.

LIST OF RECOMMENDATIONS

Recommendation 2-4-1

The Sheriff's Office should evaluate the feasibility of restarting the Stats channel during peak hours.

Recommendation 2-4-2

The Sheriff's Office should continue to pursue the implementation of mobile data communications and dispatching as an option for reducing dispatcher workload and improving the efficiency and effectiveness of dispatch communications.

Recommendation 2-5

The Comm Center should monitor dispatcher workload for each of its dispatch radios, including the number of incidents handled (dispatched calls plus on-views), radio talk time levels, and phone call volumes.

Recommendation 2-6-1

The Sheriff's Office should ensure that potential staffing and fiscal impacts are fully assessed when changes are made to Comm Center responsibilities.

Recommendation 2-6-2   The Comm Center and the KCSO Budget and Accounting Section should jointly develop a staffing relief factor appropriate for the Comm Center, and use it when planning changes in staffing and when making related staffing allocations.

Recommendation 2-7   The Sheriff's Office should:
- Clarify the terms of its agreements with Metro and Animal Control regarding full coverage of the costs of providing dispatching services;
- Make the necessary adjustment to the Sheriff's budget and Comm Center staffing; and
- Ensure the agreements are updated annually to reflect changes in staffing costs and operations.

Recommendation 2-8   The Comm Center should closely monitor its turnover rate and implement frequent and regular hiring rounds.

Recommendation 2-9   The Comm Center should continue using the vapor positions under the following guidelines:
- Use the vapor positions in conjunction with frequent hiring rounds.
- Use a conservative estimate of the Comm Center's attrition rate, and monitor changes regularly, to determine how many vapor positions can be used without creating a year-end budget deficit.

Recommendation 2-10   The Comm Center should:
- Update the minimum staffing levels using a method that provides staffing recommendations designed to meet call-answering standards (based on queuing analysis) and consider purchasing a software program that will simplify this process.

- Collect data on the duration of outbound calls made by primary call receivers and use it when updating the staffing model.
- Revise the minimum staffing level model to separately specify how many primary and secondary call receivers are recommended throughout the day.
- Consider revising staffing levels to reflect *quarterly* changes in call characteristics.
- Continue to track workload data on call volumes, duration, and work time, and use this data to periodically check staffing level adequacy (annually should be adequate).

King County Auditor's Office

AUDITOR'S MANDATE

The King County Sheriff's Communications Center was reviewed by the County Auditor's Office pursuant to Section 250 of the King County Home Rule Charter and Chapter 2.20 of the King County Code. The audit was performed in accordance with generally accepted government auditing standards, with the exception of an external quality control review.

1 INTRODUCTION

Background

The King County Sheriff's Office Regional Communications Center (Comm Center) provides emergency 911 services, police dispatching, and crime reporting services to approximately 570,000 residents living in unincorporated King County and 13 contract cities. It is one of 17 Public Safety Answering Points (PSAP) in King County. The Comm Center also answers fire and medical 911 calls for unincorporated county areas; however, local departments provide the actual dispatching for these non-police emergencies. In addition, staff also provides call receiving and dispatching for the Metro Transit Police and dispatching for King County Animal Control.

The Comm Center's 2001 budget (funded through the CX fund) was approximately $5.7 million with a staff of 90 FTEs. Three additional FTEs are funded through the Criminal Justice Fund.

The Comm Center is currently housed on the first floor of the King County Courthouse; however, a new Regional Communications and Emergency Coordination Center (RCECC) is under construction with a planned completion for summer 2003. It will be sited in Renton and will house both the Sheriff's Comm Center and the Office of Emergency Management Coordination Center. This project was accelerated in 2001 in response to the February 28th earthquake and related concerns about the Comm Center and Emergency Management Division being housed in non-earthquake-retrofitted buildings.

King County Auditor's Office

Comm Center Operations and Staffing

The Comm Center operates 24 hours a day, seven days a week, with staffing organized around three main shifts: Day (7 a.m. – 3 p.m.), Swing (3 p.m. – 11p.m.), and Graveyard (11 p.m. – 7 a.m.).[1] The operations are divided into two primary functions: answering incoming calls and dispatching deputies in response to emergency calls. Exhibit A demonstrates the flow of events as a call comes into the Comm Center.

**EXHIBIT A
Call Center Flow Chart**

```
                          ┌──────────────────┐
                          │  Incoming Call   │
                          └──────────────────┘
                                   │
  ┌───────────────┐     ┌────────────────────────┐     ┌─────────────────┐
  │    Police     │─────│ Primary Call Receivers │─────│  Non-Emergency  │
  │   Emergency   │     └────────────────────────┘     └─────────────────┘
  └───────────────┘                │                            │
          │                        ▼                            ▼
          │              ┌──────────────────┐        ┌────────────────────┐
          │              │ Fire, medical,   │        │ Primary call       │
          │              │ other calls are  │        │ receiver routes    │
          │              │ transferred to   │        │ call to Secondary  │
          │              │ appropriate      │        │ Call Queue.        │
          │              │ jurisdiction.    │        └────────────────────┘
          │              └──────────────────┘                 │
          ▼                                                    ▼
     Primary Call                                    Secondary Call Receiver
     Receiver enters                                 writes criminal offense
     incident                                        report or handles caller's
     information into                                concern, and records
     Computer                                        incident in CAD.
     Automated
     Dispatch system
     (CAD).
          │                                                    │
          ▼                                                    │
  ┌──────────────────┐                                         │
  │ CAD sends "Call  │◄····································       │
  │ for Service" to  │                                         │
  │ Dispatcher.      │                                         │
  └──────────────────┘                                         │
          │                                                    ▼
          ▼                                          ┌────────────────────┐
  ┌──────────────────┐                               │ Secondary Call     │
  │ Dispatcher       │                               │ Receiver uses IRIS │
  │ contacts         │                               │ computer database  │
  │ officers by radio│                               │ to record report.  │
  │ and communicates │                               └────────────────────┘
  │ nature of        │
  │ emergency and    │
  │ location.        │
  └──────────────────┘
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SOURCE: Comm Center

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[1] These start and end times are tied to patrol shifts in the field. They intentionally begin one hour later than patrol shifts to avoid simultaneous shift changes among Comm Center and patrol staff.

Call Receiving

The Comm Center's phone services are provided by "primary" call receivers who answer all incoming calls, including 911 and non-emergency calls. They are responsible for:

- Answering calls, determining the type of assistance required, and assisting callers as needed.
- Using the Computer Automated Dispatch (CAD) system to send calls for service to the appropriate dispatcher.
- Sending non-emergency calls to secondary call receivers.
- Transferring fire and medical calls to the appropriate jurisdiction.
- Placing outbound phone calls in response to abandoned 911 calls.

The main elements, or indicators, of a primary call receiver's workload are *incoming call volumes*, the *average duration* of these calls, and the *number of outbound calls* made.

On each shift, a limited number of "secondary" call receivers are typically available to complete reports for people calling to report crimes that do not require a deputy to be dispatched to the scene.[2] For example, it is not likely that the perpetrator of a theft or vandalism occurring several days in the past would be apprehended at the scene, so a report is taken over the phone instead of dispatching a deputy. These reports are written using a computer program called Incident Reporting and Investigation System (IRIS) that is also used by field deputies, and which provides centralized tracking of police incidents. As shown in Exhibit A, the initial phone calls reporting such events are answered by the primary call receivers and transferred to the secondary call receivers, who then record the incident in the CAD system and write a report. If the emergency phone lines

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[2] The Comm Center has responsibility for handling the following types of reports: larceny, fraud, vandalism, runaways, missing persons, harassing phone calls, problem phone calls, lost property, abandoned vehicles, traffic complaints, and traffic incident reports.

become too busy, secondary call receivers can be switched to "primary" status to help answer incoming calls.

Dispatching

Dispatchers provide *police* dispatching services for each of the Sheriff's four precincts and the Metro Transit Police. Each precinct has one main radio frequency that the dispatcher uses to communicate with and dispatch deputies. Three main radios operate 24 hours a day (North Precinct 2, Southeast Precinct 3, and Southwest Precinct 4), and the fourth operates 16-18 hours a day (Shoreline/Northwest Precinct 5). The Metro Transit Police radio operates 20 hours a day with shorter weekend hours. The number of deputies on each radio typically ranges from 11 to 26 on the main dispatch radios, with increases above this during special operations and shift changes.

Each dispatcher is responsible for the following tasks for their respective precinct:

- Dispatching deputies to citizen calls for assistance (*dispatched calls for service*).
- Monitoring deputies' location, status, and safety while they are responding to dispatched calls as well as to incidents they encounter in the field (*on-views*).
- Tracking deputies' availability.
- Managing radio communications and serving as the primary communication link for the deputies on-duty.
- Performing deputy-requested computer searches, such as suspects' names and license plates, on local, state, and national databases (called Stats checks).
- Providing non-radio support services for deputies in the field, such as making phone calls for medical aid units, tow trucks, assistance from other police jurisdictions, or to get more information from the initial 911 caller.

The primary elements of dispatcher workload include the *number of deputies* being monitored and dispatched, the *number of incidents* that occur (*dispatched calls* plus *on-views*), the amount of *radio usage* or "talk time," and the number of database Stats checks run and phone calls placed.

The Comm Center also provides non-police dispatching services for King County Animal Control. On weekdays during regular working hours, complaint calls are answered by the Animal Control office and transferred to the Comm Center dispatcher, who then communicates over the radio to Animal Control staff in the field. The Comm Center has responsibility for answering all calls on nights, weekends, and holidays.

Performance Standards

As a designated PSAP in King County, the Comm Center operates under an agreement with the King County Emergency Management Division's Enhanced 911 Office (E-911), the agency responsible for countywide coordination of 911 services. Each PSAP is responsible for providing a base level of emergency communications services by meeting the following operational standards and requirements:

PSAP Requirements

- Answering 911 calls in a timely manner according to the established King County PSAP standard: *90 percent of 911 calls in ten seconds or less, 75 percent of the time.*
- Providing 24-hour service, emergency power equipment, and backup call routing.
- Recording all incoming calls.
- Training personnel.
- Providing telephone communication capabilities for the hearing impaired.
- Responding to all abandoned 911 calls.
- Documenting call data using E-911 equipment.

- Maintaining a seven-digit non-emergency number.
- Maintaining up-to-date information on its service area and residents' telephone numbers, and notifying the E-911 office of any annexations or incorporations.

The Comm Center must meet these standards in order to maintain its status as a PSAP and receive its share of E-911 excise tax revenue.

Call-Answering Standards

To measure its performance, the Comm Center focuses primarily on the ability of its call-receiving staff to answer 911 calls as quickly as possible. As mentioned in the list of operating standards above, as a PSAP the Comm Center must answer 90 percent of its 911 calls in less than ten seconds, for 75 percent of the hours in a quarter. This is often referred to as the "90/10/75 call-answering standard" and is very similar to standards used nationwide to measure the performance of 911 systems. The Comm Center has established minimum levels at which it must staff in order to meet this performance standard. These staffing levels vary by time, day, and season, according to variances in call volume patterns.

AUDIT SCOPE AND OBJECTIVES

Performance Audit Requested by Council

In March of 2001, the King County Auditor was asked by the Metropolitan King County Council to conduct a performance audit of the Sheriff's Communications Center. This request arose as a result of concerns raised by Comm Center staff regarding the work environment, increasing turnover, vacancy and overtime rates, and the call receivers' recent difficulty meeting the 90/10/75 call-answering standard.

During our audit survey work, dispatcher-field radio communication concerns were also brought to our attention, including problems caused by radio communication congestion, increases in the number of deputies per dispatcher, and static interference. These problems were reportedly impacting the ability of dispatchers to effectively and efficiently manage their workload and radio communications with deputies in the field.

Audit Questions

To gain an understanding of these concerns and to evaluate the Comm Center's overall performance, the Auditor's Office undertook a performance audit that focused on the following questions:

1. Is the Communications Center providing emergency communications services effectively and efficiently?
2. Do recent changes in workload, management, or staffing factors explain the Comm Center's performance difficulties?

Because the performance concerns centered primarily on communications operations, the Data Control and Technical Support units were not included in our audit. In addition, because of the expected completion of the new RCECC in the spring of 2003, we focused our review on operational and staffing issues related to Comm Center performance. Beyond investigating some of the employees' more critical environmental concerns, we did not evaluate workplace issues that are expected to be resolved with the move to the new RCECC.

AUDIT METHODOLOGY

To put the current situation in perspective, the audit team first assessed the current staffing and performance situation in the Comm Center in comparison to its historical experience. We

also compared its current operations to available professional standards for performance and operations, as well as the practices of local, comparable emergency communications centers. Our fieldwork included observations in the Comm Center, listening to incoming calls and radio communications, patrol ride-alongs, and visits to other communications centers.

Audit Focused on Three Main Areas

To research the reasons for the Comm Center's recent performance difficulties, we focused our analysis on the following three areas:

1. Assessing the current "State of the Comm Center," in light of its past performance.
2. Analyzing historical changes in call receiver and dispatcher *workload*.
3. Evaluating the effectiveness of the Comm Center's *management and staffing practices*.

Our review covered the period from 1997 through 2001. Chapter 2 of our report is organized around these three study areas.

Area 1: Current "State of the Comm Center"

To review the Comm Center's overall performance and to develop an understanding of how its current situation compares to that of the last several years, the audit team reviewed indicators of the Comm Center's operational effectiveness. These included a review of its past performance record on meeting the 90/10/75 call-answering standard, an analysis of its historical turnover and vacancy rate, a comparison of Comm Center operations to professional standards and the practices of other local communications centers, and a review of some of the workplace issues causing concern among staff.

Area 2: Workload Analysis

Call Receivers

The Comm Center has maintained a significant amount of data over the years on key elements of call receiver workload, including:

- Number of incoming and outbound phone calls.
- Duration of inbound calls.
- Amount of crime reports taken.
- Time spent "at work" in between phone calls.

We used this data to determine whether call receivers had experienced changes in their workload over a four-year period, from 1998 to 2001, and whether or not workload changes had any impact on the call receivers' performance on the call-answering standard. We analyzed the data by month, day, and time, and supplemented this information with additional analysis of how workload *per individual* has changed.

Dispatchers

The Comm Center itself does not have historical data on dispatcher workload to the extent it does for call receivers. However, the audit team obtained data from several Sheriff's Office's sources outside of the Comm Center on most of the key elements of the dispatcher position, including:

- The average number of patrol deputies and other deputies that dispatchers have typically managed on their radios since 1995.
- Three years of data on the number of incidents handled ("dispatched calls" plus "on-views").
- Current radio talk time information and some limited historical figures for comparison.

The Sheriff's Office provided us with estimates of minimum and maximum staffing levels for patrol and other deputies who

frequently use the radios, from 1995 to 2001. We used this data to determine if the number of deputies per dispatcher has changed. We used dispatched calls and on-views data to analyze changes in the number of incidents handled by each of the precinct dispatch radios by month, day of the week, and for each shift (day, swing, and graveyard). Finally, using two weeks of radio data showing the amount of time the radios were in use (talk time) and statistics from past reports, we compared current radio use with that of several years ago to determine if it had changed. Data on other elements of a dispatcher's job, such as the number of database searches dispatchers perform for field deputies and the number of phone calls placed and taken, were not available.

Area 3: Management and Staffing Practices

To determine whether factors other than workload could have impacted the Comm Center's performance, we evaluated core elements of its operations, including the impact of recent responsibility changes and the effectiveness of its staffing management practices.

Impact of expanded responsibilities
The Comm Center experienced some significant changes in responsibility in recent years, including staff reductions following the closing of the Federal Way dispatch radio in 1996, the subsequent additional dispatching responsibilities for Animal Control, Metro Transit Police, and the new Shoreline Precinct, and expanded responsibilities of secondary call receivers. The audit team reviewed the impact of these changes on operations, staffing, and call receiver and dispatcher workload.

Staffing management
To determine whether the Comm Center's staffing management practices may have impacted its overall ability to operate effectively, we reviewed its current recruiting, hiring, and training

methods and evaluated them in light of their staffing requirements. For comparative purposes, the audit team also reviewed the Comm Center's methods to those of other comparable communications centers and to applicable professional practices.

We also evaluated the staffing methods used by the Comm Center to manage its call receiver staffing and ensure call-answering standards are met, and attempted to determine:

- Whether their staffing "model" had been appropriately designed.
- Whether the Comm Center was using the staffing model;
- If the staffing levels established by their model were accurate.
- If adjustments to the model could improve performance on the call-answering standard.

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2 COMM CENTER WORKLOAD CHANGES AND OPERATIONAL FACTORS

Audit Overview

Our performance audit reviewed the Comm Center's overall performance and analyzed the reasons for its recent performance difficulties. We found that the Comm Center is in overall compliance with its Public Safety Answering Point (PSAP) requirements and that its operations are consistent with industry practices and standards. However, the Comm Center has experienced some serious operating difficulties over the last two years, including substantial increases in turnover and vacancy rates and subsequently a sharp rise in its use of overtime to maintain operational staffing levels. These factors have interfered with the Comm Center's ability to efficiently provide emergency communications services and its ability to effectively meet its call-answering standard.

Our analysis of the Comm Center's workload and operations found that its performance difficulties were caused by a combination of:

- Increases and changes in workload levels of call receivers and dispatchers.
- An expansion of the Comm Center's responsibilities without corresponding staff increases or workload adjustments.
- Staffing management practices that need updating to reflect staffing needs and changes in workload.

Our report makes recommendations to the Comm Center and the Sheriff's Office to enhance workload monitoring efforts, pursue options for relieving dispatcher workload and strain on the dispatch communication system, improve the methods used to calculate staffing and cost impacts of changes to the Comm

Center's workload, and to strengthen and update specific staffing management practices. As will be discussed in more detail, the Comm Center management is proactively taking steps to address these recent problems and to improve its performance.

CURRENT "STATE OF THE COMM CENTER"

To assess the Comm Center's overall performance and develop an understanding of how its current situation compared to that of the last several years, the audit team reviewed aspects of the Comm Center's operational effectiveness. These included its historical staff turnover and vacancy rate, record meeting the 90/10/75 call-answering standard, a comparison of Comm Center operations to professional standards and the practices of other local communications centers, and a review of some of the workplace issues causing concerns among staff.

FINDING 2-1

THE COMM CENTER HAS EXPERIENCED RECENT OPERATING DIFFICULTIES THAT HAVE IMPACTED ITS ABILITY TO OPERATE EFFICIENTLY AND TO EFFECTIVELY MEET ITS PERFORMANCE STANDARDS.

Staff Turnover and Vacancy Rates

Our research shows that the Comm Center has been experiencing some significant staffing difficulties in recent years, with sharp increases in its staff turnover and vacancies. Data shows that between 1997 and 2001 the average annual vacancy rate nearly tripled, from 5 to 14 percent, peaking at 22 percent in June of 2001. The Comm Center's turnover rate increased by 25 percent during this four-year period. The Comm Center subsequently had to use significant amounts of overtime to cover for the staff vacancies, which resulted in large expenditures and rising workload pressures on the staff.

Our comparative research shows that regular turnover is common in the field of emergency call centers. Due to the high stress nature of the job and the requirement for shift work, this industry typically experiences ongoing recruitment and retention challenges. Emergency 911 centers, both locally and nationally, experienced increasing staffing difficulties during the economic boom of the last several years, and the Comm Center was no exception. However, the sharp increase in turnover and vacancy rates experienced by the Comm Center over the last couple of years is not consistent with its past record. At the time of our study, the Comm Center's vacancy rate was higher than that of other local communications centers.

We found that the rising turnover and vacancy rates reduced the number of available operations staff by approximately 13 percent. To maintain dispatcher radio coverage and continue minimum call receiver staffing levels, the Comm Center had to significantly increase its use of overtime. In 2001, the total number of overtime hours worked was nearly four times higher than in 1997, with overtime per person increasing from an annual average of four to 24 hours per month. During its peak busiest times in the summer of 2001, our analysis shows that the Comm Center had to use overtime to staff up to 20 percent of its operating hours, in comparison to a high of 7 percent in 1998.[3] Exhibit B shows operational staffing and overtime expenditures from 1997 to 2001.

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[3] There is a clear relationship between the decrease in available operations staff and overtime expenditures in the Comm Center. Our statistical correlation analysis indicates that nearly all (95 percent) of the increase in overtime can be attributed to decreases in the number of "available operations staff."

EXHIBIT B
Comm Center Available Operations Staff
**and Overtime (OT) Expenditures 1997 – 2001**
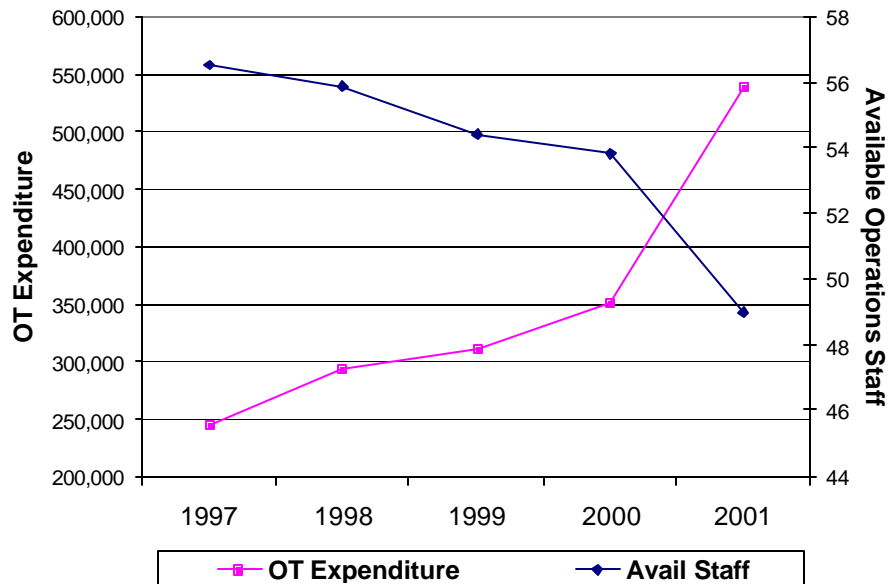
In addition, the high vacancy rate made it difficult for the Comm Center to consistently maintain call receiver staffing at appropriate levels, which impacted its ability to answer emergency calls according to call-answering standards for timeliness. These factors are discussed in more detail in the Workload Analysis section of this report. (See Finding 2-7)

Performance Standards   Our audit found that, according to the Emergency Management Division, the Comm Center is in overall compliance with its PSAP requirements and has been relatively successful in meeting the 90/10/75 call-answering standard. Between 1997 and 2000 it missed the standard two out of 16 quarters. No E-911 revenue was withheld because these instances did not occur consecutively and the Comm Center was able to improve its performance immediately following the quarters missed.

However, in 2001 the Comm Center did not meet its performance standard for two consecutive quarters (the second and third), answering 70 and 62 percent of its calls, respectively, within the standard instead of the required 75 percent. Because the quarters were consecutive, the E-911 office subsequently withheld excise tax funds ($59,628) for the first time. The Comm Center would have also missed the standard during the fourth quarter except for an E-911 equipment failure that resulted in a loss of data. As a result, the Comm Center technically met the standard and the withheld funds were released. Exhibit C shows the Comm Center's quarterly performance on the call-answering standard from 1997 to 2001.

EXHIBIT C
Percent of Hours
Comm Center Met Standard
1997 – 2001
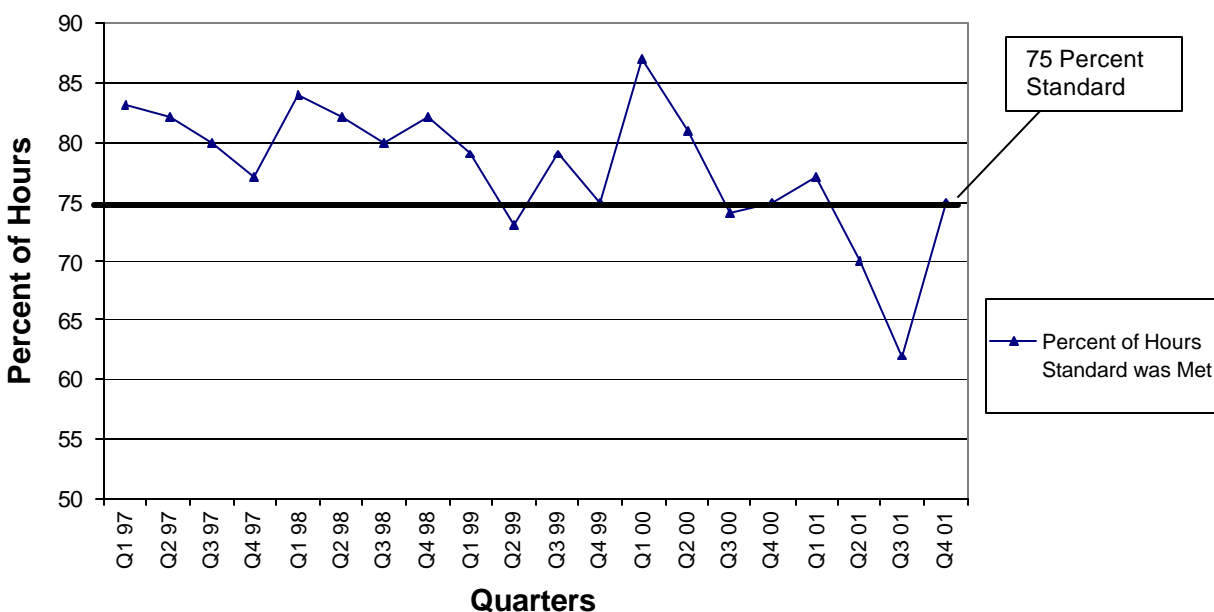
SOURCE: King County Emergency Management Division, E-911 Office

In January and February of 2002, the Comm Center answered 86.8 and 84.8 percent of its calls in less than ten seconds, well above the performance standard. This improved performance

can be attributed to the hiring of additional staff and the lower call volumes that typically occur this time of year.

Environmental Issues

Our review of the workplace concerns raised by Comm Center staff indicates that the most significant concerns have been resolved or are being addressed; however, some challenges are expected to be ongoing. These workplace concerns centered primarily on air quality and other environmental issues, and were reportedly negatively impacting staff morale. Comm Center management has been working with the Facilities Management Division regarding air quality issues within the Comm Center, which is located adjacent to the King County Courthouse loading dock and garbage collection area. In order to reduce odors in the Comm Center, the Courthouse air intake duct has been relocated further away from the first floor loading dock, and efforts are being made to reduce odors from garbage trucks and idling of delivery vehicles. Additionally, air and fabric samples have been tested and found to be within safe ranges.

Due to the aging ventilation system of the Courthouse and the Comm Center's proximity to the loading dock, problems with odors from the docking area could be an ongoing challenge in the present location. However, the move to the new RCECC in 2003 should resolve these issues.

WORKLOAD ANALYSIS

As discussed in Chapter 1, our audit included an analysis of Comm Center workload to determine if it might have changed and had a subsequent impact on performance. We analyzed trends in call receivers and dispatchers' workload, including call volumes and durations, reports written, incident levels, patrol staffing and radio use, over the last several years.

Workload Increased Somewhat…	We found that dispatchers, and to a lesser extent call receivers, have experienced some overall growth in workload with substantial increases on certain days and shifts. These increases have impacted the Comm Center's ability to effectively meet their call-answering standard and have contributed to dispatcher communication difficulties.
…But Only Partially Explains Performance Difficulties.	However, the overall workload changes were modest, and only partially explain the Comm Center's recent operating difficulties. This is discussed further in the *Management and Staffing Practices* section of this chapter.

|	
FINDING 2-2	**PRIMARY CALL RECEIVER WORKLOAD HAS INCREASED SUBSTANTIALLY DURING CERTAIN DAYS AND TIMES AND MOST LIKELY IMPACTED THEIR ABILITY TO MEET THE CALL-ANSWERING STANDARD.**
Primary Call Receivers	Audit staff analyzed four years of data on emergency and non-emergency calls, from 1998 to 2001, to determine if the workload for primary call receivers had changed and if there had been any impact on their performance levels.

Incoming Calls

Our analysis shows that while the total number of incoming calls rose slightly, by 3 percent, they increased sharply during certain days and times. In particular, call volumes during the summer and fall of 2001 were consistently higher throughout most of the day and evening hours than in 1998. Also, the increases on Fridays and Saturdays were notable, ranging up to 20 percent during the midday hours. Exhibits D and E demonstrate how call volumes changed between 1998 and 2001, overall and by time of day.

EXHIBIT D
Total Calls to the KCSO Communications Center
**1998 – 2001**
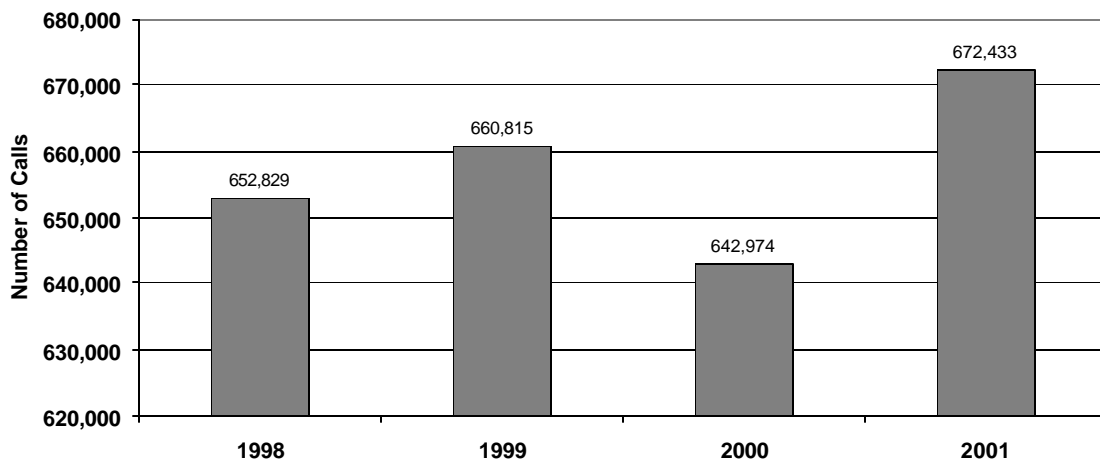
SOURCE: Comm Center call volume reports.

Because the call volume increases were concentrated on certain days and times, call receivers working at those times experienced noticeable workload impacts. During 2001, each call receiver handled between 10 to 19 percent more calls on most day and swing shifts than in 1998. Fridays and Saturdays often showed the largest increases in calls taken by each call receiver.[4] See Appendix 1 for more detail.

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[4] This increase in calls per person is partially due to the Comm Center's high vacancy rate and inability to staff at its higher summer staffing levels during 2001. Summer staffing levels are typically one person higher than in the winter.

EXHIBIT E
Average Change in Incoming Calls
1998 – 2001
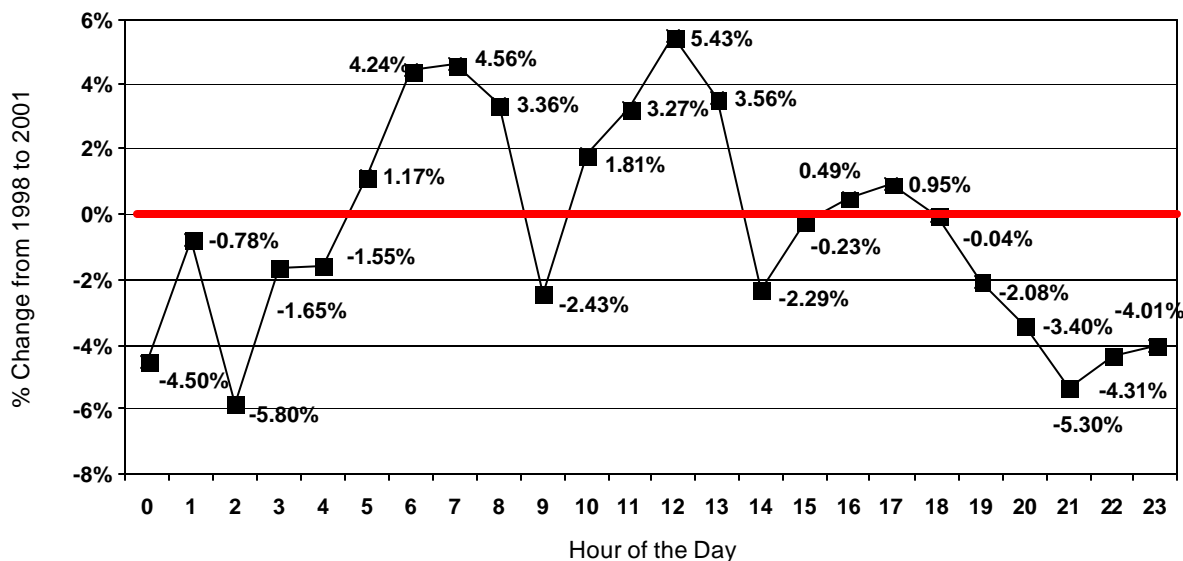
SOURCE: Comm Center call volume reports.

Outbound calls

Although our research on outbound calls placed by primary call receivers shows relatively no overall change between 1998 and 2001, the patterns have changed. For example, call volumes increased 15 percent on Fridays during the winter. The duration of these calls is unknown because this information is not tracked by the Comm Center. See Appendix 1 for more detail.

Performance Impact

Performance Was Sometimes Affected by Higher Call Volumes

The Comm Center's performance and call volume data indicate that these increases in workload did have an impact on their ability to meet their call-answering standard at certain times, but at other times it is more difficult to draw this conclusion. For example, during some periods when call volumes show an increase, the Comm Center missed the performance standard

even though they were staffing at levels that were previously adequate.[5]

At Other Times Understaffing Was a Factor.

However, there are other times when they missed the standard and call volumes had increased, but they were not staffing at their minimum levels. In these cases we could not conclude that workload increases (as opposed to understaffing) were the sole cause of primary call receivers missing the standard during these times. It was most likely a combination of the two.

A significant amount of call receiver workload data is tracked by the Comm Center, and we were therefore able to identify specific workload impacts in many cases. However, while outbound call volumes are tracked, their *duration* is not. Because our interviews indicate these calls can be lengthy, they most likely have an effect on the ability of call receivers to meet the call-answering standard; however, their impact is unknown. This is discussed further under Finding 2-10.

FINDING 2-3

SECONDARY CALL RECEIVER WORKLOAD HAS DECREASED IN SOME AREAS AND INCREASED IN OTHERS. THESE CHANGES MAY HAVE IMPACTED THEIR PERFORMANCE.

Secondary Call Receivers

As discussed in Chapter 1, the main workload drivers for secondary call receivers are the *number of crime reports* they complete, the *number of phone calls* answered, and the *duration* of those calls. Audit staff analyzed this data to determine if workload had increased and if there had been any impact on call receivers' performance levels.

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[5] Because the staffing model was originally designed appropriately, we are assuming that the staffing levels were adequate the last time the model was updated. See Finding 2-10 for further discussion. For example, on Saturdays during the winter in 2001, the Comm Center experienced an increase in calls, were staffing at their minimum levels , and still did not meet their call-answering standard.

Crime Reports and Phone Calls

Number of Reports Declined Somewhat

Overall, our audit found that secondary call receiver workload decreased in some areas, and increased in others. The audit team's analysis shows that between 1999 and 2001 the *number of reports* completed by secondary call receivers dropped somewhat, by 3.6 percent. However, even though levels declined overall, the changes were not evenly distributed throughout the day and there were increases at other times. For example, the number of reports processed during the later hours of the graveyard shift dropped by 35 percent. In contrast, reports taken in the evening increased 21 percent.

With regard to the *number of phone calls* taken by secondary call receivers, the workload changes are again mixed. Total calls declined by 11 percent; however, the *average duration* of those calls increased substantially, by almost 19 percent. We were not able to determine the reasons for the longer call durations. However, some possible explanations include the Comm Center's increased emphasis on customer satisfaction, and the recent loss of many of its more experienced staff.

New Responsibilities for Secondary Call Receivers

Alternative Call Handling Increased Report Responsibilities

In August of 1999, the types of reports taken by secondary call receivers were expanded as part of the Alternative Call Handling initiative. The purpose of this initiative was to increase the types of non-urgent crime reports that could be handled by the Comm Center, instead of by deputies in the field, thereby freeing up deputies' time to pursue Community Oriented Policing efforts.

Although there was an initial increase in the number of reports taken by secondary call receivers, the number has actually declined by 3.6 percent over the last two years. However, the Alternative Call Handling initiative was accompanied by the transition to a new computerized report-writing system called

IRIS (Incident Reporting and Investigation System) and our interviews with management and staff indicate that it did not go smoothly. Staff encountered a steep learning curve adapting to the new system with reports reportedly taking longer to complete in IRIS than by hand. This is supported by the fact that secondary call duration has increased 19 percent since 1999.

Also, in 1999 secondary call receivers were given new responsibilities for checking certain crime report hotlines. The Abandoned Vehicle hotline was added in May and the Runaway Return hotline was added in October.

Performance Impact

Average Time On Hold Has Doubled

In conclusion, our analysis found that the workload patterns of secondary call receivers changed, with some notable decreases and increases. However, it is difficult to determine whether these changes impacted secondary call receivers' ability to efficiently process calls. One indication that these changes may have had an effect is that the average time callers spent on hold doubled between 1999 and 2001, increasing from about 2.8 to 5.6 minutes.[6] However, there are a number of factors other than workload that may have caused this increase, including the longer average call durations and a possible reduction in the number of secondary call receivers working.[7] We therefore cannot conclude whether or not workload changes are entirely responsible for the longer hold times.

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[6] This is the amount of time calls are holding after being transferred by primary call receivers and before being answered by secondary call receivers.
[7] As discussed in Chapter 1, secondary call receivers can be switched over to "primary" status when emergency call queues become too long. This has reportedly occurred more frequently this year due to increased call volumes and understaffing but cannot be verified because of unavailable data.

FINDING 2-4   **INCREASES IN THE NUMBER OF DEPUTIES PER DISPATCH RADIO AND IN RADIO TALK TIME ARE STRAINING DISPATCH COMMUNICATION RESOURCES.**

Dispatchers

To determine whether dispatcher workload has increased in recent years, the audit team researched changes in the *number of deputies* that dispatchers monitor and dispatch, the *number of incidents* handled, and historical *radio usage* or talk time, for each precinct dispatch radios. Our analysis of these workload indicators shows that overall dispatcher workload has risen in most of these areas and the dispatch communication system is showing signs of strain.

Deputies per Dispatcher

Number of Deputies per Dispatch Radio Has Increased

Data from the Sheriff's Office shows that the number of deputies that dispatchers are responsible for monitoring and dispatching rose between 1995 and 2001, with most of the growth occurring on the day shift.[8] Most notable was the growth in the number of deputies on the Southeast dispatch radio, which increased 45 percent during the day shift. Deputies on the Southwest dispatch radio rose slightly (2.5 percent). Patrol staffing on the North dispatch radio dropped by 9 percent; however, this decrease was due to the 1998 division of the North Precinct into two parts, North and Shoreline, when it was determined that the dispatchers and radio talk time on the North dispatch radio had reached their capacity. The number of deputies on the Shoreline dispatch radio has remained the same since the precinct was created in 1998. As can be seen in Appendix 2, the patrol changes are largely due to staffing adjustments in the contract cities.

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[8] These figures were taken from data provided by the Sheriff's Office on the *minimum* number of patrol and other deputies who regularly or frequently use the radio. With the exception of 2001 data, these figures are estimates based on precinct rosters.

The number of active deputies on each radio typically ranges from 11 to 26 on the three main dispatch radios, with staffing on the Shoreline radio ranging from two to eight. These figures vary by shift, and can be higher during special operations and shift changes. Dispatch data from a "typical" day in August showed that dispatchers managed from 30 to 50 active deputies at a time for sustained periods of two hours during shift changes.

Dispatched Calls for Service and On-views

**Number of Incidents Remained About the Same, With Some Variations**

Our analysis of incident levels (dispatched calls for service plus on-views) handled by dispatchers between 1999 and 2001 increased on some of the dispatch radios, and remained the same or dropped on others. Overall, incident levels have declined by about 2 percent, with most of the reduction occurring during the graveyard shift and some slight increases on the day shift.[9] The Southwest and Southeast dispatch radios are significantly busier than the other radios. Exhibit F shows the change in incident levels for each dispatch radio from 1999 to 2001.

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[9] Because the Metro dispatch radio did not start operations until September 2000, it is excluded from this 1999 to 2001 comparison. When Metro is included, the total number of incidents handled by dispatchers in the Comm Center increased by six percent.

EXHIBIT F
Change in Total Incidents by Dispatch Radio
1999 – 2001
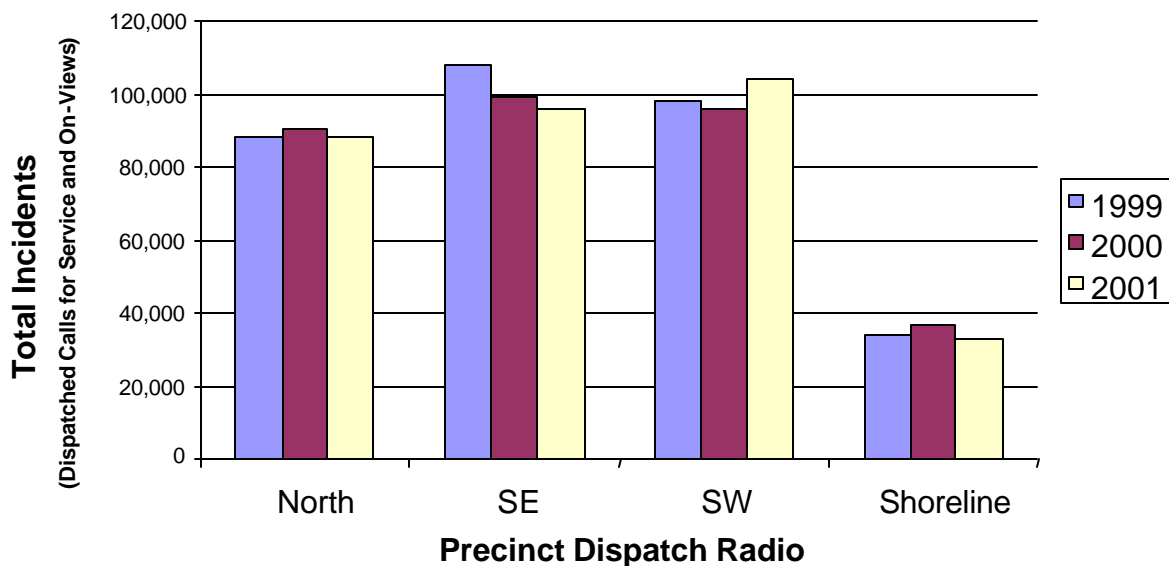
SOURCE: KCSO Research, Analysis, and Information Services Unit

The most notable increase was on the Southwest dispatch radio, which experienced a 6 percent overall increase in the number of incidents handled, with consistent increases during most months, on nearly every day of the week, and on every shift. During the day shift, for example, there was a 10 percent increase in the number of incidents. In contrast, incident levels on the Southeast dispatch radio dropped by 11 percent, with most of the decline occurring during the graveyard shift. The number of incidents handled by the North dispatch radio remained about the same, and on the Northwest/Shoreline dispatch radio they decreased in number. See Appendix 3 for more detailed information for each precinct.

Our research found that no professional or operating standards exist regarding recommended workload levels for dispatchers. However, a 1995 study of dispatcher workload in the Sheriff's Comm Center determined that 11 to 13 incidents per hour was generally the maximum a dispatcher could manage effectively,

figures that are also backed up by external research.[10] In 2001, the average number of incidents per hour on each of the three main dispatch radios regularly exceeded these levels by two to five incidents throughout most of the swing shift and early hours of the graveyard shift.

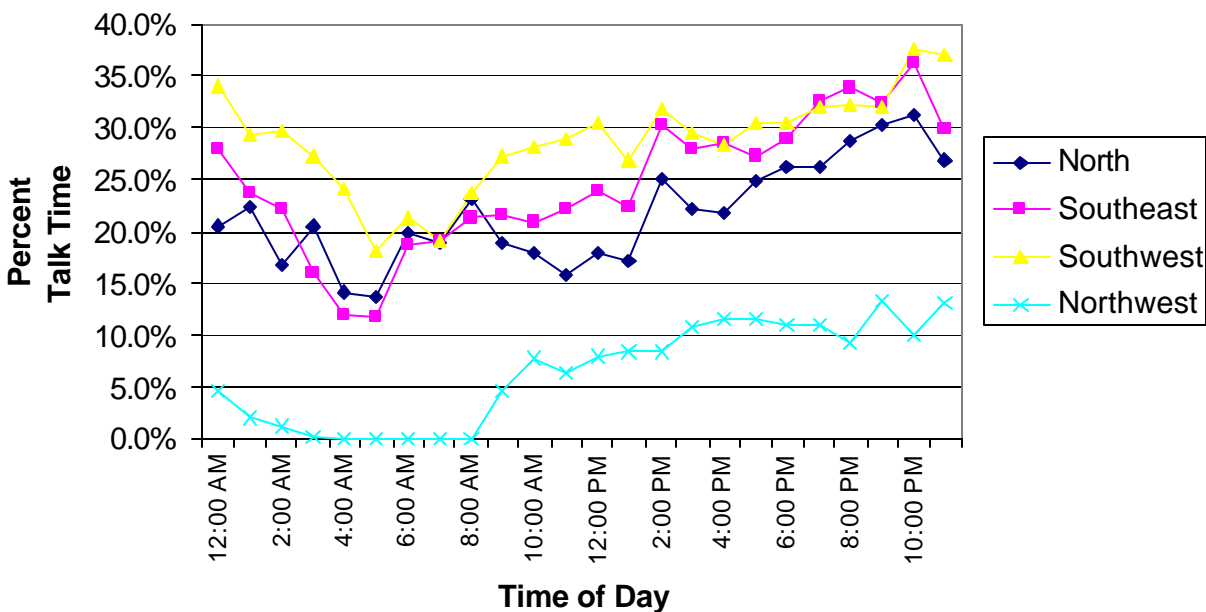### Radio Talk Time

Radio Talk Time Levels Have Risen

Data shows that over the last several years the amount of time the radios are in use (talk time) has increased for all precinct dispatch radios. Our analysis of a "typical" two week period in September shows average talk times of 25 percent on the three 24-hour precinct radios, 5 percent higher than levels cited in a 1995 study.[11] The Southeast and Southwest radios are consistently the busiest, averaging 30 and 31 percent talk time during the swing shift, with peaks over 50 percent. The North dispatch radio is somewhat less busy with averages in the low 20 percent range, and the NW/Shoreline, Metro and Animal Control dispatch radios typically average less than 10 percent talk time. Exhibit G demonstrates these variances in average radio talk time.

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[10] *Joint King County-Valley Communications Center Consolidation Study*, 1995, p. 13 and p. 19. This determination was based on a dispatcher workload model developed for the study that considered patrol staffing levels, the amount of dispatcher time required to dispatch and track one incident, and other patrol support tasks performed by dispatchers. Also see 1) *Radio Channel Loading Study and Review*, Adcomm Engineering, 1997, "Task-Based Police Dispatch Capacity Influences," and *Guide to Computer Aided Dispatch Systems,* Report # NBSIR-2991, National Institute of Justice, 1985, p. 36
[11] *Joint King County-Valley Communications Center Consolidation Study*, 1995, p. 25.

EXHIBIT G
Average Talk Time by Dispatch Radio
September 10 – 23, 2001

SOURCE: King County Radio Communication Services

Radio Use Increases May Be the Result of Several Factors

The rise in radio talk time could be the result of several factors, including increases in the number in deputies on each radio. Another cause is the recent discontinuation of the Comm Center's Stats channel. Staff on this radio supported dispatchers by performing computer searches of names and license plates in response to deputies' requests. These communications can be lengthy (for example, dispatchers have to read complete criminal histories or arrest warrant information). The Stats channel was intended to relieve dispatcher workload and free up air time by taking these conversations off the main radio channel. However, the Comm Center phased out the Stats channel between 1997 and 2000 in response to increases in dispatching responsibilities and staffing limitations, and ended its operations in September 2000. (See Finding 2-6 for further discussion.) This change shifted stats requests back onto the precinct dispatch radios.

While there are no professional or operating standards for appropriate radio use levels, audit staff reviewed past Comm Center studies and other available research and identified recommended benchmarks of 30 to 35 percent talk time levels for effective communication on public safety radio systems.[12] During the two week period for which we had radio data, our analysis of talk time shows that the Southeast and Southwest dispatch radios exceeded the 30 percent benchmark an average of seven and ten hours per day, respectively, and operated just below it (more than 25 percent talk time) for an average of 12 and 17 hours per day, respectively. More detailed information for each dispatch radio can be found in Appendix 4.

Performance Impact

Dispatch Communications Showing Signs of Strain

Two studies of the Comm Center's radio communications performed in 1995 and 1997 concluded that dispatch operations were nearing their effective capacity.[13] As this report has already discussed, radio talk time, the number of deputies per dispatch radio, and the average number of incidents per hour are higher now than they were when these studies were performed.

During our audit, we were informed that some of the effects of increasing dispatcher workload and radio congestion have included:

- Difficulty effectively managing and supporting radio requests from the increasing number of deputies.

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[12] *Radio Channel Loading Study and Review*, Adcomm Engineering, 1997. p. 11. These figures are based on a principle of communications traffic over a trunked radio system that states that the more talk time there is, the longer radio users will have to wait before they can get on the radio. The 35 percent talk time is the level at which 90 percent of users will have less than a ten second delay to getting on the radio. A 30 percent standard is referenced in *Guide to Computer-Aided Dispatch Systems*, Report #NBSIR-2991, National Institute of Justice, 1985, p. 36.
[13] *Radio Channel Loading Study and Review*, Adcomm Engineering, 1997, p. 2. Also see the *Joint King County-Valley Communications Center Consolidation Study*, 1995, p. 28. These conclusions were based on analyses of radio talk time levels and of dispatcher workload, including incidents per hour, number of deputies monitored, and time-motion data. Our audit team reviewed the methodologies used in these studies and found them to be reasonable; however, we did not conduct a workload study as part of this audit and thus cannot independently confirm the previous studies' conclusions.

- Increasing delays getting on the radio when needed (for both dispatchers and deputies) due to the growing talk time levels.
- More frequent need for dispatchers to halt non-emergency radio communications during high priority incidents ("closing the air").

In addition, other problems inherent to radio communications, such as truncated voice transmissions, recurring static, and difficulty getting radio reception, also interfere with dispatcher-patrol communications. The audit team's observations in the Comm Center and ride-alongs with patrol deputies confirmed these reported workload and communication difficulties.

As mentioned earlier, the North Precinct was divided in 1998 to relieve the growing strain on dispatcher workload and radio communications created by increases in deputies and radio traffic. This has provided some relief to the North dispatch radio; however, because the radio is still combined with the NW radio during certain hours, radio traffic can sometimes be even higher than on the other channels. The Southeast and Southwest radios now support about the same number of deputies and radio talk time levels as did the North radio before it was split.[14]

Increasing Dispatcher Workload and Radio Talk Time Reduce Efficiency and Effectiveness

The effects of increasing workload and radio use can create inefficiencies and impact the effectiveness of dispatcher-deputy communications. For example, as dispatchers become busier, deputy waiting times for information or assistance grow longer. High talk time levels can cause communication delays, while poor radio reception and truncated communications require messages to be retransmitted or prevent communication altogether. Our interviews indicate that these problems have become more of an issue in recent years.

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[14] See current talk time statistics in Appendix 4. For historical data see *Radio Channel Loading Study and Review*, Adcomm Engineering, 1997, "Radio Channel Utilization by Channel" (in Appendix).

Dispatching and Communications via "Mobile Data"

"Mobile Data" May Improve Communication Efficiency and Effectiveness

In our review of dispatching practices nationally and locally, the audit team learned that law enforcement jurisdictions have, over the last decade, increasingly used a technology generally referred to as "mobile data" for their dispatcher-deputy communications. This wireless system allows dispatchers to communicate with deputies by typing a message on their computer and sending it to "mobile data computers" (MDCs) in deputies' cars (similar to e-mail). Because dispatchers and deputies don't have to wait for an open radio channel or wait for the other party to answer before sending their message, it can be more efficient than voice communications.

For example, mobile data communications would be of benefit when addresses and larger amounts of information are transmitted. Using the current system, a dispatcher uses the radio to call a deputy, waits for the deputy to become available, and reads the information over the radio. Deputies then have to stop and write the information down, and if there is a lot of information or static interference, they have to call the dispatcher back to confirm the information is correct. With a mobile data system, dispatchers could simply type and send the information, and finish the communication. Deputies would not need to stop to write the information down or call back on the radio to clarify the message.

It can also enable deputies to directly access law enforcement databases and run their own "stats checks" on license plates and suspects' names, which relieves dispatcher workload and can reduce deputy wait times.[15] At this time, King County is one of

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[15] While deputies do have laptop computers, their data access capability is limited because their equipment does not allow wireless computer downloads/uploads of real-time information. Currently, they must stop at the precinct before their shift to download the most current IRIS database information, and rely on the dispatchers for all other information that needs to be provided on a real-time basis (such as criminal records, arrest warrants, stolen vehicle records, etc.).

the only major law enforcement jurisdictions in King County without wireless mobile data dispatching and communication capability.[17]

Research on mobile data's potential to reduce dispatcher workload has been done in the Comm Center that suggests it has the potential to reduce dispatcher workload and radio talk time. Dispatcher workload analysis performed for the Comm Center in 1995 estimated that enabling deputies to run their own database searches through mobile data computers would relieve dispatcher workload by approximately 27 percent.[18] Other research suggests database tasks have a significant workload impact for dispatchers.[19] Our interviews indicate that radio talk time can be reduced significantly, by up to 50 percent, with the implementation of mobile data dispatching and communications.

It is important to note that mobile data would reduce, not eliminate, the need for radio communications. Direct voice contact between dispatchers and deputies would still be necessary during higher priority incidents, when timeliness and deputy safety is critical, or when deputies cannot access their computers.

Based on this research, it appears that a wireless dispatch communication system has the potential to relieve dispatcher workload, reduce radio talk time, and improve the efficiency and effectiveness of the communication system. Relieving workload and radio congestion could also potentially delay or prevent the need for future radios splits, which would be a significant cost-savings.

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[17] Most major police departments in King County, and many smaller departments, use mobile data for dispatching and data communication, with the exception of Bellevue/Eastside, which is in the process of setting up their system.
[18] *Joint King County/Valley Communications Center Consolidations Study*, 1995, p. 26.
[19] *Guide to Computer Aided Dispatch Systems*, Brenner and Cadoff, U.S. Department of Commerce, March 1985, Appendix p. 35.

Consistent with this research, implementing mobile data is one of the Sheriff's Office's priorities in its current business and technology strategy plans.

RECOMMENDATIONS

2-4-1 The Comm Center should evaluate the feasibility of restarting the Stats channel during peak hours.

2-4-2 The Sheriff's Office should continue to pursue the implementation of mobile data communications and dispatching as an option for reducing dispatcher workload and improving the efficiency and effectiveness of dispatch communications.

FINDING 2-5 **THE COMM CENTER COULD IMPROVE ITS MONITORING OF DISPATCHER WORKLOAD.**

Dispatcher Workload is Not Monitored

Our review also found that the Comm Center does not regularly monitor the workload levels of its dispatching operations. While data on the number of dispatched calls for service and on-views dispatchers handle is available from the KCSO's Research, Planning, and Information Unit, the data is typically maintained for patrol purposes and has not been used to monitor dispatcher workload. Radio talk time levels are checked only sporadically and information on other indicators of dispatcher workload, such as the number of database queries run and phone calls answered, is not available.

As a result, the Comm Center has not maintained a good understanding of dispatcher workload levels, which has limited its ability to proactively manage its dispatcher resources. For example, if management decided to relieve dispatcher workload by providing a few targeted hours of stats support, it would have to rely on anecdotal information to determine which hours

typically have the most incidents and highest radio talk time, and thus where the limited amount of additional stats support could provide the most relief. Having systematic management information would improve the Comm Center's ability to manage such dispatcher workload decisions.

RECOMMENDATION

2-5   The Comm Center should monitor dispatcher workload for each of its dispatch radios, including:

- Number of incidents handled (dispatched calls and on-views).
- Radio talk-time levels.
- Phone call volumes.

MANAGEMENT AND STAFFING FACTORS

To determine whether factors other than workload could have impacted the Comm Center's performance, we evaluated the operational impact of recent responsibility changes and the effectiveness of its staffing management practices.

In summary, we found that over the last four years the Comm Center's staffing resources have been strained by a number of coinciding factors. These included the addition of dispatching responsibilities without commensurate staff increases; hiring practices that created a gap in the flow of new employees; and a staffing model that has not been updated to reflect workload changes.

FINDING 2-6   **THE COMM CENTER'S RESPONSIBILITIES WERE EXPANDED; HOWEVER, THE STAFFING INCREASES IT RECEIVED WERE INSUFFICIENT TO COVER THE ADDITIONAL STAFFING REQUIREMENTS.**

The Comm Center has experienced some significant changes over the last six years. In 1996, Federal Way discontinued its police services contract with King County, and in response to the reduced need for services, the Sheriff's Office reduced Comm Center staffing by 10.5 communication specialists.

New Responsibilities

Sheriff's Office Added New Responsibilities to the Comm Center

Since then, the Sheriff's Office has gradually increased the Comm Center's radio dispatching responsibilities, with the addition of dispatch services for King County Animal Control, the new Shoreline Precinct, and the Metro Transit Police. Our analysis of the staffing requirements of these new positions shows that although the Comm Center received some staffing increases during this period, they were insufficient to cover the additional radio dispatching responsibilities.

Over a four-year period the Comm Center was given additional dispatching responsibilities requiring approximately 13 FTEs; however, it only received nine additional dispatching FTEs. Exhibit H demonstrates the staffing required for the new positions and how many new FTEs were received.[20] To staff the new dispatching positions, the Comm Center used existing call receiving staff and discontinued a dispatcher support function.

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[20] To calculate the number of FTEs needed for each position, the audit team developed an *estimated* staffing "relief factor" for staff in the Comm Center, using information on work hours, break times, and vacation and sick leave taken by employees. Because we used a conservative estimated relief factor, the staffing needs for the new responsibilities are most likely low. See Appendix 5 for a more detailed explanation of the methodology used.

EXHIBIT H
Expanded Comm Center Responsibilities
and Related Staffing Allocations
1997 – 2001

	Estimated Staff Needed	Actual Staff Allocated	Difference
Dispatchers			
Animal Control (5/97)	3.2	0.0	-3.2
Shoreline Dispatch Radio (9/98)	4.7	5.5	0.8
Metro Transit Police (9/00)	4.9	3.5	-1.4
Dispatch Total	**12.8**	**9.0**	**-3.8**
Call Receivers			
Alternative Call Handling (8/99)	2.5	2.5	0.0
Total	**15.3**	**11.5**	**-3.8**

SOURCE: ARMS data, 1999 King County Council Adopted Budget, Comm Center records, and audit analysis.

1997: Animal Control Dispatching

No Additional Staff Received for Animal Control Dispatching

In May 1997, in response to budget reductions in the Animal Control Division, the executive asked the Sheriff's Office to take over responsibility for Animal Control dispatching. As part of the agreement, the Comm Center did not receive any additional staff to cover the new position.

To provide the necessary staffing on this dispatch radio (which required approximately 3.2 FTEs) the Comm Center reduced the operating hours of its Stats channel and used personnel previously dedicated to call receiving.

1998: New Shoreline Dispatch Radio

Extra Staff Received for New Shoreline Radio

When the North Precinct was split to relieve increasing radio traffic and dispatcher workload, the new Shoreline dispatch radio was set up to serve the new precinct. The Comm Center received 5.5 FTEs to staff the new dispatch radio. It is unclear how this staffing figure was derived; however, as shown in Exhibit H, it was approximately .8 FTEs more than the amount was needed to operate the part time radio.

August 1999: Alternative Call Handling

Additional Staff Allocated for Alternative Call Handling

In August of 1999, the types of reports taken by secondary call receivers were expanded as part of the Alternative Call Handling initiative. The Comm Center received 2.5 additional FTEs for this purpose. As discussed in the workload section of this report, although the number of reports did not increase, the Comm Center actually needed the additional staff to accommodate the longer report processing times. However, because of the increasing number of vacancies in 2000, the relief provided by the additional staff was probably not felt.

September 2000: Metro Transit Police Dispatching

Staffing Allocated for Metro Transit Police Dispatch Position Was Not Adequate

In September 2000, according to the terms of a Memorandum of Understanding (MOU), the Sheriff began providing dispatch services to Metro Transit, including call receiving and dispatching responsibilities. The Comm Center received an additional 3.5 FTEs to staff the new dispatch radio, which typically operates 20 hours per day and somewhat less on weekends. However, approximately of 4.9 FTEs are needed to staff this position, which means the Comm Center received about 1.4 FTEs fewer than it required. To provide the additional staffing, the Stats support radio was discontinued entirely, requiring deputies to run their name and license plate checks through their main precinct dispatcher.

Calculation of Staffing Needs

We were unable to determine how the staffing needs for the new Shoreline and Metro Transit Police dispatch radios were decided upon. However, we learned that Comm Center management and the KCSO's Budget and Accounting Section are not using a staffing "relief factor" for their staffing and budgeting. Because a relief factor is necessary to accurately calculate staffing requirements, the fact that they have not developed one for the Comm Center most likely explains why the staffing allocated for

the new positions did not match actual staffing needs. Not being able to adequately evaluate the staffing requirements needed for these new positions limited the Comm Center's ability to proactively manage and communicate its staffing needs.

RECOMMENDATIONS

2-6-1   The Sheriff's Office should ensure that potential staffing and fiscal impacts are fully assessed when changes are made to the Comm Center's responsibilities.

2-6-2   The Comm Center and the KCSO Budget and Accounting Section should jointly develop a staffing relief factor appropriate for the Comm Center and use it when planning changes in staffing and when making related staffing allocations.

FINDING 2-7   **THE SHERIFF'S OFFICE IS NOT BEING FULLY REIMBURSED FOR COMM CENTER DISPATCHING SERVICES PROVIDED TO OTHER AGENCIES.**

While analyzing the staff changes required by the Comm Center's new dispatching responsibilities, we found that two of the new functions being provided to agencies outside of the Sheriff's Office are not fully funded by the other agencies.

Metro Funding Does Not Cover Its Dispatch Radio Costs

The terms of the agreement between the Sheriff's Office and Metro Transit are unclear regarding whether Metro is expected to pay the full costs of the dispatching staff and of the 3.5 FTEs allocated to the Comm Center for this purpose (it is not addressed in the MOU). However, we found that the amount Metro is currently paying annually for the dispatch position is not enough to cover the cost of the 3.5 FTEs, and clearly not enough to cover the minimum of 4.9 FTEs required to staff the Metro radio, as discussed previously. According to Sheriff's Office's

2002 estimates of the cost of a Communication Specialist, Metro's contribution of $250,000 is enough to pay for only 2.8 FTEs. The full cost of 4.9 FTEs is approximately $430,600. Because these Metro positions are funded through the CX fund, the CX fund is in effect subsidizing about $180,600 in transportation costs.[21] See Appendix 6 for more detail.

As discussed above, the Comm Center does not use a relief factor to calculate staffing needs, and the Sheriff's Office Budget and Accounting Section did not use a relief factor when budgeting for the Metro position. In addition, the Metro dispatch radio is now operating longer hours than originally planned. These reasons could explain why the staffing and funding levels for the Metro position are less than what is required.

Animal Control Dispatching Responsibilities Are Unfunded

While reviewing staffing requirements for the new Animal Control dispatch radio, we learned that there is no written agreement or MOU between the Sheriff's Office and King County Animal Control regarding the terms of the agreement. As mentioned earlier, the Comm Center did not receive any additional staff to cover this position and Animal Control does not pay the Sheriff's Office for this dispatching service. Based on the 2002 estimated staffing costs, it costs the Sheriff's Office about $281,200 a year to dispatch for Animal Control. See Appendix 6 for more detail.

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[21] These figures should be treated as *estimates* because they are based on 1) the number of FTEs needed to staff the position using an *estimated* Comm Center staffing relief factor and 2) the Sheriff's Office's *estimated* 2002 cost of a Comm Center employee. See Appendix 5 for more detail.

RECOMMENDATION   The Sheriff's Office should:

2-7
- Clarify the terms of its agreements with Metro and Animal Control regarding full coverage of the costs of providing dispatching services.
- Make the necessary adjustment to the Sheriff's budget and Comm Center staffing.
- Ensure the agreements are updated annually to reflect changes in staffing costs and operations.

FINDING 2-8   **INFREQUENT HIRING IN 2000 AND 2001 CREATED A GAP IN THE FLOW OF NEW EMPLOYEES THAT CONTRIBUTED TO THE COMM CENTER'S HIGH VACANCY RATE AND IMPACTED ITS PERFORMANCE.**

Hiring Frequency   As mentioned earlier in this report, the Comm Center has historically experienced regular turnover (as do most communications centers) and over the last couple of years the turnover rate increased significantly. However, despite increasing staff turnover, there were only two hiring rounds completed in 2000 and the first half of 2001.

Between January and August 2000, the Comm Center completed one hiring round and initiated a second.[22] However, due to training scheduling difficulties and staff illness, no one was hired from the second round until May 2001, nearly nine months later. During this time period, 16 people resigned from the Comm Center, a turnover rate nearly double the average of recent years. This created a large gap in the flow of new employees, driving up the vacancy rate and preventing the Comm Center from consistently staffing at the levels needed to meet its call-answering standard.

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[22] A third lateral dispatcher recruitment was initiated; however, it yielded no results.

Since the beginning of our audit in July 2001, the Comm Center has accelerated its hiring and as of December 2001 its vacancy rate was 7 percent, down from a high of 22 percent in June 2001. Management has also begun recruiting on a modified "open-continuous" basis, and implemented a lateral hiring initiative for dispatchers, both of which are expected to relieve the current staffing crisis.

RECOMMENDATION

2-8   The Comm Center should closely monitor its turnover rate and implement frequent and regular hiring rounds.

FINDING 2-9   **PHASING OUT THE VAPOR POSITIONS CONTRIBUTED TO THE COMM CENTER'S VACANCY AND PERFORMANCE DIFFICULTIES.**

Comm Center Has Ten Unfunded "Vapor Positions"

The Comm Center has ten unfunded "vapor positions" in its budget that allow management to hire additional staff beyond the Comm Center's budgeted FTE level. These extra positions enable the Comm Center to train new employees in time to replace anticipated regular vacancies. Between 1999 and 2001, the Comm Center lost the FTE authority to use its vapor positions due to fiscal constraints, and their use was phased out.[23] As has already been discussed in this report, during this same time period Comm Center workload was increasing, additional responsibilities were added to the Comm Center, and the vacancy and turnover rates were growing. Our analysis of vapor positions shows that phasing them out contributed to the staffing difficulties.

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[23] According to the KCSO Budget and Accounting Section.

Purpose of Vapor Positions Is to Minimize Time a Position Is Vacant

The Comm Center has a lengthy six-month training program that, according to our research, is similar to training programs offered by other communications centers and meets or exceeds the professional standards for emergency communications center training. When a vacancy occurs it is therefore a minimum of six months before a new employee becomes an independent, fully trained call receiver. Vapor positions enable management to hire personnel and have them all or part of the way through training by the time the next resignation occurs. This minimizes the length of time a position is vacant and can help keep *available operational staff* (fully trained employees) close to budgeted FTE levels.

Our analysis shows that while increasing the frequency of hiring can also minimize the length of time a position is vacant, it is not possible to keep staffing at full levels without using vapor positions. Without vapor positions, management has to wait until a vacancy occurs before actively recruiting for a replacement (just like in most places of employment). However, the Comm Center's unique circumstances, including the need to meet inflexible workload demands and performance standards, require modified staffing practices in order for it to operate most efficiently. It is therefore more reasonable to hire for current vacancies *plus* the number of positions expected to be vacant over the next hiring period. This will allow the Comm Center to optimize its staffing levels.

Findings of Our Analysis

- Conducting frequent hiring of a few people is preferable to hiring larger groups of people less frequently. This will minimize staffing fluctuations, thus helping the Comm Center remain more consistent in its call-answering performance and reduce the need to use overtime staffing.

- Hiring in anticipation of the staff turnover *expected before the next hiring round*, not just for existing vacancies, will help maintain staffing levels close to budgeted FTE levels. This requires hiring into the vapor positions *in addition to existing vacancies.*

- The Comm Center cannot maintain operational staffing at allotted FTE levels without using the vapor positions.

We also found, provided that use of these positions is based on accurate turnover rates, that vapor positions will not result in expenditures above the Comm Center's current budgeted costs for its allotted FTE level. There will be some periods in which operational staffing is slightly above budgeted levels, but there will also be periods in which it is below. There would be no negative budget impact if the use of vapor positions is adjusted with the turnover rate. This should be possible because, with the exception of a higher than normal turnover rate in 2000, the Comm Center's turnover has been fairly regular over the last several years.

Since the conclusion of our analysis, the Comm Center has been granted the authority to once again begin using the vapor positions and has begun doing so. This is expected to help them more quickly rebuild and maintain their staffing at operational levels.

RECOMMENDATION

2-9   The Comm Center should continue using the vapor positions under the following guidelines:

- Use the vapor positions in conjunction with frequent hiring rounds.

- Use a conservative estimate of the Comm Center's attrition rate, and monitor changes regularly, to determine how many vapor positions can be used without creating a year-end budget deficit.

FINDING 2-10   **THE COMM CENTER'S STAFFING PLAN IS BASED ON A SOUND METHOD FOR ENSURING APPROPRIATE STAFFING LEVELS. HOWEVER, BECAUSE THE LEVELS HAVE NOT BEEN UPDATED TO REFLECT CHANGES IN CALL RECEIVER WORKLOAD, THE COMM CENTER'S STAFFING EFFICIENCY AND ABILITY TO MEET ITS CALL-ANSWERING STANDARD HAVE BEEN NEGATIVELY IMPACTED.**

Staffing Model

As part of our evaluation of the Comm Center's staffing management practices, we reviewed the methods used to manage staffing for its call receivers. Their staffing plan, or "model," provides them with the minimum number of call receivers who need to be scheduled throughout the day in order to meet the call-answering standard and provide secondary call receiver staffing. Our objectives were to determine if:

- The model was developed appropriately.
- The model was being followed.
- The staffing levels were appropriate.
- Adjustments were needed to improve performance on the call-answering standard.

Staffing Level Accuracy

We found that the Comm Center's staffing model, which was created in the early 1980s, was developed using a sound method that remains the most accurate way to staff call centers that need to meet a call-answering standard.[24] The goal of such staffing approaches is to ensure that call centers have adequate primary call receiver staffing to meet performance goals, such as the Comm Center's 90/10/75 call-answering standard. To determine if the Comm Center's "minimum staffing levels" were adequate to meet their call-answering standard, the audit team updated the model using current phone call statistics and compared the results to the existing staffing plan.

Primary Call Receiver Staffing Levels Need To Be Updated

Our analysis shows that the primary call receiver staffing levels have not been adequately adjusted to reflect the changing workload and responsibilities of call receivers. As a result of changes in call volume, duration, and work time since the model was last updated, the staffing levels are frequently below the level required for the Comm Center to meet its performance standard, and at some other times may be too high.[25] For example, during the winter months the new recommended levels are consistently higher on weekday afternoons and evenings, whereas day shift staffing on Sundays could probably be reduced. We also found that incoming phone calls show recognizable variations by the four seasons of the year, and that the Comm Center's staffing levels may need updating because they do not reflect these seasonal fluctuations.[26]

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[24] The Comm Center initially used a staffing method that made use of call center queuing analysis to determine the number of staff needed. Research shows that a model based on queuing analysis is the most effective means of ensuring call center staffing levels are adequate to meet call-answering standards.

[25] Using the same method the Comm Center originally used, the audit team entered current statistics on call volumes, durations and work time, and calculated updated staffing levels by month, day, and time. We independently corroborated our results using another staffing methodology to verify that the new staffing levels were reasonably accurate.

[26] We recognize that the staffing plan already varies by summer and winter; however, there are noticeable variations in spring and fall as well.

By comparing actual staffing to the planned minimum staffing levels, we attempted to determine if the Comm Center was following its staffing model.[27] Although the Comm Center appeared to meet minimum levels for the most part, there were times in 2001 when it did not. As discussed earlier in this report, this is most likely due to the high vacancy rates.

Limitations to Staffing Level Findings

The updated primary call receiver staffing levels provide an indication of the days and times where staffing needs have changed and where changes may be needed. However, there are some caveats to our approach.

- First, the updated staffing levels represent the staffing required to meet the call-answering standard *all of the time*, not just 75 percent of the time as the Comm Center is required to do. The levels are also based on *peak,* not average, call volumes. For these reasons, the new levels may *overstate* the actual staffing levels needed.

- Second, the Comm Center's "minimum staffing levels" include primary and secondary call receivers and do not separately state how many primary call receivers are supposed to work at a particular time. Because of the difficulty making this comparison accurately, our summary of where staffing increases are needed, and of where reductions could be made, may actually *understate* staffing needs.[28]

- Third, the Comm Center currently does not track the duration of outbound calls made by primary call receivers,

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[27] We used phone system records to determine the actual number of primary call receivers working.
[28] Because of this lack of clarity, we treated the Comm Center's minimum staffing levels as if they were *all* primary call receivers when we compared them to the updated levels. Therefore our results do not take into account the *additional* need for secondary call receiver staffing, which varies from zero to three individuals throughout the day.

and therefore this time was not included in the initial calculations. Because our interviews indicate it is a significant part of call receivers' workload, this time needs to be included for such staffing analysis to be accurate. Including the time spent on outbound calls would have the effect of *increasing* staffing requirements.

Staffing Model Does Not Provide Specific Staffing Levels for Primary Call Receivers

As mentioned above, the Comm Center's staffing model does not provide clear information on the number of primary and secondary call receivers needed throughout the day to meet the call-answering standard. This makes it difficult for management to accurately plan performance-based staffing levels, and prevents it from easily monitoring whether they are meeting their own staffing plan. If the number of primary call receivers needed to meet the call-answering standard was provided separately from secondary call receivers, the model would be a more useful staffing and monitoring tool and could potentially improve the Comm Center's performance on the call-answering standard.

It should be noted that staffing models based on workload formulas are not "a science," and should be used as a component of the decision-making process. This is because some factors that affect a call receivers' ability to quickly answer and process calls cannot be captured in a formula. For example, staff level of training and skill on the job, number of verbal interruptions, tasks completed away from the phone, and computer troubles, can either increase or reduce their speed. This makes it important for Comm Center management to use the results of such staffing models as a guideline, and to adjust actual staffing as needed according to call-answering performance, workload levels, and other factors that can influence performance.

RECOMMENDATION

2-10   The Comm Center should:

- Update the minimum staffing levels using a method that provides staffing recommendations designed to meet call-answering standards (based on queuing analysis) and consider purchasing a software program that will simplify this process.

- Collect data on the duration of outbound calls made by primary call receivers and use it when updating the staffing model.

- Revise the minimum staffing level model to separately specify how many primary and secondary call receivers are recommended throughout the day.

- Consider revising staffing levels to reflect *quarterly* changes in call characteristics.

- Continue to track workload data on call volumes, duration, and work time, and use this data to periodically check staffing level adequacy (annually should be adequate).

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